

## ORIGINAL RESEARCH

### **Complications and mortality in ST-segment elevation acute myocardial infarction in diabetic and non-diabetic patients**

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#### **ABSTRACT**

**Background:** Acute myocardial infarction (AMI) is one of the leading causes of all acute emergencies and is becoming an important public health problem in the developing countries. The present study was conducted to assess complications and mortality in ST-segment elevation acute myocardial infarction in diabetic and non-diabetic patients.

**Materials & Methods:** 80 consecutive patients of diabetic (group I) and non-diabetic (group II) having acute ST-segment elevation myocardial infarction (STEMI) of both genders were included. Different treatment was given to all patients.

**Results:** Age group <40 years had 12 diabetic and 14 non-diabetic, 40-55 years had 25 diabetic and 22 non-diabetic, 55-70 years had 15 diabetics and 18 non-diabetics and >70 years had 28 diabetics and 26 non-diabetics. The difference was non-significant ( $P > 0.05$ ). Site of AMI was anterior in 30 and 20, inferior in 20 and 40, inferior+ right ventricular in 20 and 10 and lateral in 10 and 5 in group I and II respectively. Mortality was seen in those in which streptokinase was given in 6 and 3 and streptokinase not given in 14 and 8 in group I and group II respectively ( $P < 0.05$ ). Type of treatment given was beta-blockers in 82, ACE inhibitors in 105, streptokinase in 96, aspirin in 154, statins in 128 and diuretics in 44 patients. The difference was significant ( $P < 0.05$ ).

**Conclusion:** In diabetic and in non-diabetic, reduction in mortality rate was seen with the streptokinase administration. However, diabetics not on streptokinase had higher mortality as compared to non-diabetics.

**Key words:** Diabetes, Streptokinase, Statin

#### **INTRODUCTION**

Acute myocardial infarction (AMI) is one of the leading causes of all acute emergencies and is becoming an important public health problem in the developing countries. Diabetes is a universal problem and is becoming a major concern at old age especially in obese people and in people with sedentary life style.<sup>1</sup> The risk of AMI is 2-4 times higher in diabetics. The coronary artery disease is much more serious in diabetics with about 4 times higher morbidity/mortality in men, while 8 times in women. Acute pulmonary edema, cardiogenic shock, arrhythmia, re-infarction and cerebral infarction are serious complications in diabetics.<sup>2</sup>

Worldwide the number of people diagnosed with diabetes mellitus is increasing rapidly. Diabetes is associated with a two- to four-fold increase in the risk of developing CHD, and

cardiovascular diseases are the major cause of death among diabetic persons.<sup>3</sup> It remains controversial whether diabetic persons have a similar risk of developing acute CHD events as non-diabetic patients who have suffered a prior myocardial infarction (MI). Diabetes mellitus is a major risk factor for cardiovascular disease in general and for coronary heart disease in particular.<sup>4</sup>

In patients with AMI, heart failure is characterized by diastolic dysfunction alone or systolic and diastolic dysfunctions together.<sup>5</sup> About 3% of the adult patients develop systolic dysfunction which recognized by echocardiography and is asymptomatic in about of them. Re-infarction is diagnosed by persistent and typical severe chest pain along with re-elevation of ST-segment and increased concentrations of cardiac markers in the blood.<sup>6</sup> The present study was conducted to assess complications and mortality in ST-segment elevation acute myocardial infarction in diabetic and non-diabetic patients.

## MATERIALS & METHODS

The present study comprised of 80 diabetic patients diagnosed with acute ST-segment elevation myocardial infarction (STEMI) of both genders.

Demographic data was recorded. Diabetic patients were put in group I and non- diabetic in group II. A 12-lead ECG of each patient was recorded. On the basis of ST-segment elevation in different leads, the patients were divided into 4 groups as ST-segment elevation in leads V1-V6 (anterior AMI), in II, III, aVF (Inferior AMI), in II, III, aVF+ V4R (Inferior + Right ventricular AMI) and in I, aVL, V5, V6 (Lateral AMI). 5 ml blood sample were collected and analysed for serum CK and CK-MB and Trop-T level. Results were compiled and assessed statistically. P value less than 0.05 was considered significant.

## RESULTS

**Table I Distribution of patients**

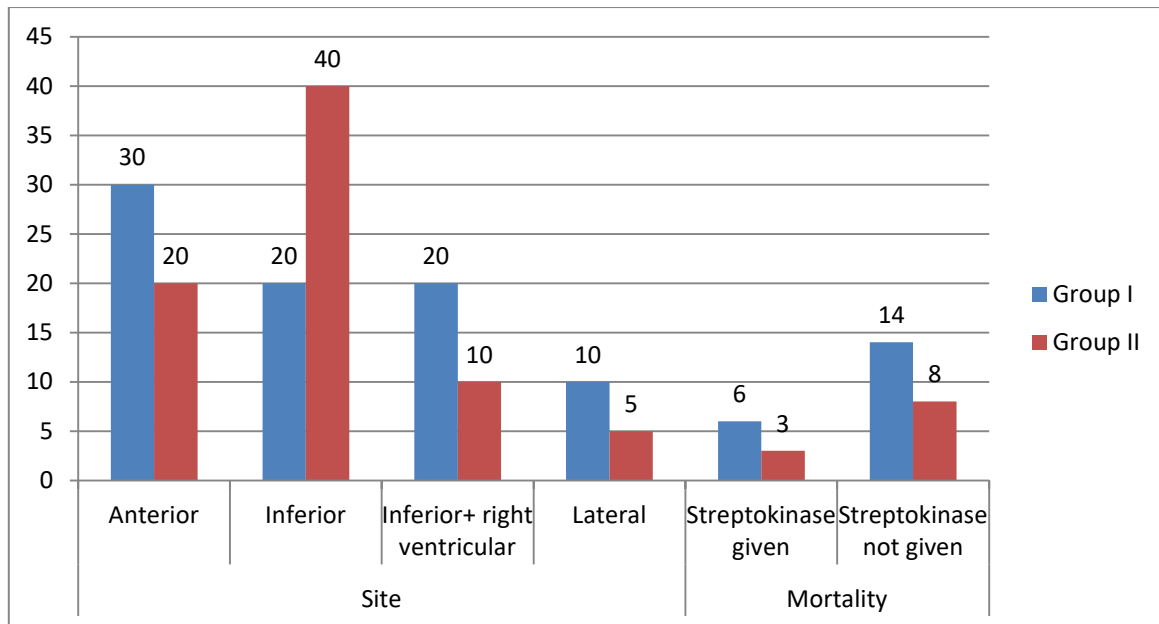
Age group (Years)	Group I	Group II	P value
<40	12	14	0.08
40-55	25	22	
55-70	15	18	
>70	28	26	

Table I shows that age group <40 years had 12 diabetic and 14 non- diabetic, 40-55 years had 25 diabetic and 22 non- diabetic, 55-70 years had 15 diabetics and 18 non- diabetics and >70 years had 28 diabetics and 26 non- diabetics. The difference was non- significant ( $P > 0.05$ ).

**Table II Comparison of parameters**

Parameters	Variables	Group I	Group II	P value
Site	Anterior	30	20	0.05
	Inferior	20	40	
	Inferior+ right ventricular	20	10	
	Lateral	10	5	
Mortality	Streptokinase given	6	3	0.04
	Streptokinase not given	14	8	

Table II, graph I shows that site of AMI was anterior in 30 and 20, inferior in 20 and 40, inferior+ right ventricular in 20 and 10 and lateral in 10 and 5 in group I and II respectively. Mortality was seen in those in which streptokinase was given in 6 and 3 and streptokinase not given in 14 and 8 in group I and group II respectively ( $P < 0.05$ ).



**Table III Treatment given to patients**

Treatment given	Number	P value
Beta- blockers	82	0.01
ACE inhibitors	105	
Streptokinase	96	
Aspirin	154	
Statins	128	
Diuretics	44	

Table III shows that type of treatment given was beta- blockers in 82, ACE inhibitors in 105, streptokinase in 96, aspirin in 154, statins in 128 and diuretics in 44 patients. The difference was significant ( $P < 0.05$ ).

## DISCUSSION

Acute myocardial infarction (AMI) is one of the leading causes of all acute emergencies and is becoming an important public health problem in the developing countries. Diabetes is a universal problem and is becoming a major concern at old age especially in obese people and in people with sedentary life style.<sup>7</sup> Furthermore, the recent National Cholesterol Education Program III guidelines<sup>3</sup> have elevated diabetes to a coronary disease risk equivalent. Among patients with diabetes who survived myocardial infarction (MI), less is known about subsequent morbidity and mortality.<sup>8</sup> Diabetes is associated with a marked increase (by a factor of two to four) in the risk of coronary heart disease. Clinically established coronary heart disease itself is associated with an increase in mortality from coronary heart disease by a factor of three to seven, depending on the mode of presentation.<sup>9</sup> The plasma cholesterol level is a strong predictor of the risk of cardiovascular events both in patients with diabetes and in patients with coronary heart disease.<sup>10</sup> It has been suggested that such patients should be treated as if they had established coronary heart disease.<sup>11</sup> The present study was conducted to assess complications and mortality in ST-segment elevation acute myocardial infarction in diabetic and non-diabetic patients.

We found that age group <40 years had 12 diabetic and 14 non- diabetic, 40-55 years had 25 diabetic and 22 non- diabetic, 55-70 years had 15 diabetics and 18 non- diabetics and >70 years had 28 diabetics and 26 non- diabetics. Abid et al<sup>12</sup> evaluated the in-hospital mortality and complications of acute myocardial infarction in diabetic and non-diabetic patients. Four

hundred and forty-eight (448) patients were studied. Patients were divided into two groups of diabetics and non-diabetics depending on the presence of diabetes mellitus. Diabetic patients presented in more advanced Killip class as 32 (26.7%) patients presented in Killip class II, 13 (10.8%) patients presented in Killip class III and 6 (5%) patients presented in Killip class IV. In the non-diabetic group, 68 (20.7%), 24 (7.3%) and 11 (3.4%) patients presented in these Killip classes respectively ( $p < 0.042$ ). The total in-hospital mortality was 17%. Mortality was 28 (23.3%) in diabetics and 48 (14.6%) in non-diabetics ( $p < 0.03$ ). In-hospital mortality was almost double in diabetics as compared to non-diabetics. Mechanical complications were observed in 42 (35%) patients in diabetic group and 80 (24.4%) patients in non-diabetic group. Left ventricular failure was the most commonly observed mechanical complications. Electrical complications were observed in 84 (70%) diabetic and 162 (49.4%) non-diabetic patients ( $p < 0.205$ ).

We found that site of AMI was anterior in 30 and 20, inferior in 20 and 40, inferior+ right ventricular in 20 and 10 and lateral in 10 and 5 in group I and II respectively. Mortality was seen in those in which streptokinase was given in 6 and 3 and streptokinase not given in 14 and 8 in group I and group II respectively ( $P < 0.05$ ). Iqbal et al<sup>13</sup> in their study complications of acute myocardial infarction (AMI) and the outcome were compared between diabetics and non-diabetic patients. Different complications studied varied significantly within diabetics, non-diabetics and in overall after controlling for diabetes. Complications showed similar pattern in diabetic and non-diabetic patients. The abnormalities were cardiogenic shock, left ventricular failure, re-infarction, arrhythmia and ventricular septal defect were 4.2, 4.7, 21.3, 4.2 and 85.24 times higher in diabetics, respectively. Mortality due to STEMI in diabetics was 2.3 times higher than in non-diabetics. Mortality varied significantly between different age groups in non-diabetics and in overall after controlling for diabetes. In non-diabetic group, mortality was 8.4 times higher in patients those were not given streptokinase than those were given streptokinase, while in diabetic group it was 2.5 times higher in patients were not given streptokinase than those were given streptokinase. The results indicate that the diabetics have higher risk of mortality.

We found that type of treatment given was beta- blockers in 82, ACE inhibitors in 105, streptokinase in 96, aspirin in 154, statins in 128 and diuretics in 44 patients. Jomaa et al<sup>14</sup> determined the prognostic value of hyperglycemia on-admission in patients presenting with STEMI. A total of 1289 patients were included. Mean age was  $60.39 \pm 12.8$  years and 977 (77.3%) patients were male. Prevalence of diabetes mellitus was 70.2% and 15.2% in patients presenting with and without hyperglycemia, respectively. In univariate analysis, hyperglycemia was associated to in-hospital death in diabetic and non-diabetic patients. In multivariate analysis, hyperglycemia was independently predictive of in-hospital death in diabetic patients but not in non-diabetic patients. Area under ROC curve of glycemia as a predictor of in-hospital death was 0.792 in diabetic and 0.676 in non-diabetic patients.

## CONCLUSION

Authors found that in diabetic and in non- diabetic, reduction in mortality rate was seen with the streptokinase administration. However, diabetics not on streptokinase had higher mortality as compared to non- diabetics.

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